REMARKS

Applicant has carefully reviewed and considered the Final Office Action mailed on January 23, 2001, and the references cited therewith.

Claims 1, 31, 42-43, 45-48, and 50-53 are amended to clarify that in the processes thereof, the reaction volume of gas is located above the substrate surface within a chemically reactive distance of the substrate, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume. These amendments are supported in the specification at page 6, lines 1-6, and page 7, lines 15-20. No new matter is introduced thereby. Claim 37 has been canceled without prejudice or disclaimer thereto in a previous response. Claims 1-2, 4-6, 31-36 and 38-54 are pending in this application. A clean sheet of currently pending claims is filed herewith for the Examiner's convenient reference.

Reservation of Right to Swear Behind References

Applicant reserves the right to swear behind any references which are cited in the stated rejections under 35 U.S.C. 103. Statements distinguishing the claimed subject matter over the cited references are not to be interpreted as admissions that the references are prior art. Furthermore, Applicant reiterates that amendments made to distinguish pending claims from such references are made without prejudice or disclaimer. Accordingly, Applicant reserves the right to reintroduce the same or substantially similar subject matter should Applicant choose to swear behind such references in the future.

§103 Rejection of the Claims

Hisamune in view of Wang et al.

At paragraph 2 of the Office Action, claims 1-2, 4-6, 31, 33-36, 38, 39-41, 42, 43-44, 45-47, and 50 were rejected under 35 USC § 103(a) as being unpatentable over Hisamune (JP 2-050966) in view of Wang, et al. (U.S. Patent No. 5,000,113).

Claims 1, 31, 42-43, 45-48, and 50-53 have been amended to clarify that in the processes thereof, the reaction volume of gas is located above the substrate surface within a chemically reactive distance of the substrate, the reactant gases in the reaction volume taking part in

heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume.

The Hisamune reference is used as the primary reference and combined with the other references to support the rejections of the claims, however, Hisamune and the other references fail to provide all the elements of the claimed invention, and fail to provide a teaching or motivation to make the combinations cited by the Examiner.

All of Applicant's pending claims, i.e. claims 1-2, 4-6, 31-36 and 38-54, include the limitation that in the processes thereof, the substrate surface is heated to a temperature of at least 480C to about 700C, the reaction volume of gases is exposed to a high intensity light source to increase the functional atomic oxygen concentration and reduce the fixed charge in the deposited films, and the reaction volume of gas is subjected to a pressure of approximately 200 to 760 Torr during deposition. Among other limitations absent in the cited combination of references, neither Hisamune nor any combination based thereon teaches or suggests a method as set forth in Applicant's claims including these limitations.

At page 6, the Office Action mailed August 30, 2000 states, "Hisamune is silent about pressures", a statement with which Applicant agrees. Applicant further agrees with the statement at page 2 (paragraph 2) of the Final Office Action mailed January 23, 2001 that Hisamune "does not (1) expressly teach a temperature range of 'at least 480C to 700C'; 2) specifically indicate a pressure range of 200 to 760 during deposition; or 3) specifically state in the Abstract that the functional atomic oxygen would be increased by the light source and thereby reduce the fixed charge in the oxide layer".

The foregoing amendments to claims 1, 31, 42-43, 45-48, and 50-53 clarify that in the processes thereof, the reaction volume of gas is located above the substrate surface within a chemically reactive distance of the substrate, the reactant gases in the reaction volume taking part in heterogeneous chemical reactions, rather than homogeneous reactions taking place in the chamber outside of the reaction volume. Applicant states in its disclosures at page 7, line 21-26, "The high intensity light source needs to be applied only to the reaction volume and can be supplied by an array of lamps arranged to give uniform illumination of said volume. It is not necessary to illuminate the gas volume in the rest of the CVD chamber or to illuminate the substrate surface. This process is different from photon-assisted CVD, where it is the substrate

reaction surface on which photons are directed to increase reaction rates."

In addition to the other limitations absent in Hisamune, Applicant cannot find in Hisamune a teaching or suggestion of a reaction volume as set forth in these claims. Hisamune (in the translation thereof, see Patent Claim) refers only to "irradiating the inside of the reaction furnace with ultraviolet radiation to induce a photochemical reaction of the gaseous starting materials with ozone."

Further, Applicant's disclosure at page 7, lines 17-20 and the claims as amended define the reaction volume "as taking part in heterogeneous chemical reactions, rather than the homogeneous reactions that take place in the gas volume in the rest of the chamber." Applicant cannot find in Hisamune or the cited combinations any teaching or suggestion of a reaction volume located within a chemically reactive distance of the substrate as set forth in the claims.

Unless based on impermissible hindsight, Applicant respectfully submits that the Examiner appears to be taking Official Notice of these missing elements and teachings. In accordance with MPEP §2144.03, Applicant traverses the taking of Official Notice, and requests that the Examiner cite a prior art reference in support of the assertion or submit an affidavit as required by 37 CFR 1.104(d)(2).

The Office Action mailed January 23, 2001 also states "Applicant's specification indicates deposition parameters including a temperature range of 200-700C with a preferred of 480C and a pressure range of 0.1 to 760 Torr with 200 Torr preferred (specification, page 7) -- not the ranges now claimed: 480-700C and 200-760 Torr". Applicant objects to this statement.

The Examiner seems to be taking the position that the ranges of 480-700C and 200-760 Torr are not supported by Applicant's disclosure. This statement, however, takes a position inconsistent with the position espoused by the Examiner in withdrawing the rejection under 35 USC § 112, first paragraph in the Office Action mailed August 30, 2000. The Examiner has already agreed that the range of 480-700C is supported by Applicant's disclosure. Applicant has asserted and the Examiner has accepted that if a range of about 200-700 degrees C is supported by the specification, a range of X-700 degrees C is supported by the specification, where X is between 200 and 700. Support for the range of 480-700 degrees C is found in the specification at page 7, line 6 of the specification. The temperature of 480 degrees C is inherently subsumed in the range of 200-700 degrees C recited in the specification. Applicant insists based upon the

same reasoning that the range of 200 to 760 Torr is likewise supported by Applicant's disclosure at page 7, lines 3-8.

The Office Action further contends regarding claims 33-35 that "Wang et al. teach a similar TEOS/ozone process where helium is used as a carrier gas and a pressure range of about 10-200 Torr is taught (col. 20, lines 40-49)". Applicant notes, however, that at col. 21, lines 9-16, Wang et al. further state, "The thermal CVD process of the present invention uses unusually high deposition chamber pressures: pressures of preferably at least ≥10 torr and of about 20-200 torr are utilized. Even the lower portion of this range is over 20 times greater than the total pressure normally utilized in processes utilizing TEOS. The high pressure increases the density of available reactive species and, thus, provides a high deposition rate." Wang therefore teaches that one of ordinary skill in the art would, in processes utilizing TEOS, observe a total pressure of less than 1/20th of 20 torr, i.e. less than 1 torr.

Applicant submits that in view of the teachings of the cited combination, Applicant's pressure range of approximately 200 to 760 torr is unexpected, and would not be attempted absent the teachings of Applicant's disclosure.

Applicant respectfully traverses the Examiner's position that the optimization of parameters is an obvious variant of the prior art. The *In re Aller* and *In re Huang* cases are simply not applicable in all situations. There must be some teaching in the prior art to suggest that the claimed parameters should be varied and that there is some motivation to do so. Applicant's specification suggests the temperature ranges and supports the reasons for such ranges. The prior art teaches away from a higher temperature range and there is no other reference to suggest that a higher temperature would bring the results suggested by the Examiner. The prior art teaches away from a higher pressure range and there is no reference to suggest that an unusually high pressure as set forth in Applicant's claims would be attempted. Thus, the combination lacks all elements of the claimed invention. The instant situation does not fall within the purview of *Aller* or *Huang*. The general conditions of Applicant's claims are not disclosed in the prior art, as required by both *Aller* and *Huang*.

Regarding the combination of the Hisamune and Wang references, Applicant respectfully notes that Hisamune appears to be directed only to photo-CVD where Wang is directed only to thermal or plasma enhanced CVD, and etching. Applicant respectfully submits that Hisamune's

designation of only photo-CVD teaches away from the use of other CVD processes in conjunction with its disclosure, just as Wang's designation of only thermal or plasma enhanced CVD processes teach away from the use of other CVD processes in conjunction with its disclosure.

Furthermore, Hisamune refers to its Table 1 to illuminate its favoring of a process disclosed therein producing a higher deposition rate and lower etching rate. Hisamune appears to teach away from etching where Wang et al. (col. 5, lines 32-40 and 50-52; col. 22, lines 55-58 and 66-68) teach etching.

Applicant respectfully submits that there is no teaching or suggestion to combine these references absent Applicant's own disclosure. Accordingly, Applicant respectfully submits that the rejection of claims 1-2, 4-6, 31, 33-36, 38, 39-41, 42, 43-44, 45-47, and 50 is unsupported.

Applicant thus respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a), and allowance of claims 1-2, 4-6, 31, 33-36, 38, 39-41, 42, 43-44, 45-47, and 50.

Hisamune in view of Wang et al. and McDowell et al.

At paragraph 3 of the Office Action, claims 32, 51 and 52 were rejected under 35 USC § 103(a) as being unpatentable over Hisamune (JP 2-050966) as applied to claim 31 and further in view of McDowell, et al. (U.S. Patent No. 4,287,083).

In the interest of brevity, Applicant refers to the arguments made hereinabove regarding Hisamune and any combination thereof. Applicant respectfully maintains that the combination of Hisamune and McDowell is not proper. Applicant reincorporates previous arguments to that effect.

Even if combination is proper, which Applicant does not admit, the combination fails to teach or suggest each and every element of Applicant's claims. Applicant cannot find in the combination of Hisamune and McDowell, the processes stated in claims 32, 51 and 52. Among other limitations, Applicant cannot find in the combination a teaching or suggestion of a the stated process, wherein a reaction volume is subjected to a pressure of approximately 200 to 760 Torr during deposition. Further, Applicant cannot find in the combination a teaching or suggestion of the stated process including heating a substrate to a range of at least 480C to about

700C. In fact, the only reference to temperature in McDowell is a teaching of maintaining a reaction temperature of below 40C (Example I), and storing the resulting reaction product of the free radical polymerization reaction described therein at 60C (Example XVIII).

Withdrawal of the stated rejection is respectfully requested, in addition to allowance of claims 32, 51 and 52.

Hisamune in view of Wang et al. and Imai et al.

At paragraph 4 of the Office Action, claims 1, 2, 4-10, 41, 43-44, 45-47, 48-49 and 50 were rejected under 35 USC § 103(a) as being unpatentable over Hisamune (JP 2-050966), Wang et al. and Imai et al. (U.S. 5,633,211).

In the interest of brevity, Applicant incorporates all of the foregoing arguments regarding Hisamune and any combination thereon, and arguments regarding the combination of the Hisamune and Wang references.

Applicant notes further that the Imai et al. patent issued May 27, 1997 claiming an effective U.S. filing date of March 26, 1993. Since Imai et al. issued after the filing date of the present application (i.e., April 22, 1996), Imai et al. may be properly defined as a reference under 35 U.S.C. § 102(e). Since Imai et al. may be a reference defined under 35 U.S.C. § 102(e), it is a removable reference if Applicant proves a date of invention predating March 26, 1993 (the effective filing date of the Imai et al. patent). Applicant respectfully reserves the right to file a Petition under 37 C.F.R. § 1.131 to swear behind the Imai et al. patent. However, because Applicant deems Imai et al. to be distinguishable from the instant claims, Applicant at this time does not choose to remove Imai et al. as a reference, but reserves exercising this right for a later date.

Applicant respectfully submits that it is improper to combine Imai et al. with Hisamune or any combination based thereon. It is apparent from Hisamune that photo-CVD was understood in the art at the time of the earliest priority date claimed by Imai et al. *See* Translation of Hisamune, page 2, lines 7-13; Imai et al., Front Page, section 30. Yet Imai et al. specifically recites conventional CVD in conjunction with the source compounds relied upon by the rejection. Imai et al., column 1, lines 42-46 and Table. Given Imai et al.'s specific designation of conventional CVD for use with the source compounds, Applicant respectfully

submits that there is no motivation to combine Imai et al. with Hisamune and its photo-CVD process. Applicant further respectfully submits that Imai et al.'s designation of conventional CVD teaches away from the use of other CVD processes in conjunction with its disclosure.

Accordingly, Applicant respectfully submits that it is improper to combine the references in a manner necessary to support rejection of claims 1, 2, 4-6, 41, 43-44, 45-47, 48-49 and 50. Applicant respectfully submits that there is no teaching or suggestion to combine the references absent Applicant's own disclosure. Applicant respectfully submits that the rejection of claims 1, 2, 4-6, 41, 43-44, 45-47, 48-49 and 50 is unsupported. Applicant thus respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a), and allowance of claims 1, 2, 4-6, 41, 43-44, 45-47, 48-49 and 50.

Applicant considers additional elements and limitations of Applicant's claimed invention to further distinguish over all of the cited references, and Applicant reserves the right to present further arguments to this effect at a later date.

As all of the limitations of the claims are not found in the prior art references, Applicant respectfully requests reconsideration and allowance of claims 1-2, 4-6, 31-36 and 38-54.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 371-2148 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

GURTEJ SINGH SANDHU ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 371-2148

Date 4/23/01 By _____
Leoniede M. Brennan
Reg. No. 35,832

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 23 day of April, 2001.

Tina Pugh
Name

_____
Signature